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Title:

RACK WITH ELEMENTS OF DOUBLE AXIS OF ROTATION FOR DISHWASHERS ;

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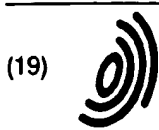
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ABSTRACT:

A domestic dishwasher rack comprising a structure formed from shaped rods or similar rod-like elements and carrying at least one device able, by angular movement, to assume different positions in order to increase the versatility of the rack in its use; said device comprises at least two components (9, 13, 16, 17), a first component (13) being supported by the rod or similar structure and able to be angularly moved about a fixed geometrical axis (12), and a second component (16, 17) being carried by the first and able to be angularly moved about a geometrical axis (15) which is parallel to the preceding and pertains to said first component.



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(54) Rack with elements of double axis of rotation for dishwashers

(57) A domestic dishwasher rack comprising a structure formed from shaped rods or similar rod-like elements and carrying at least one device able, by angular movement, to assume different positions in order to increase the versatility of the rack in its use; said device comprises at least two components (9, 13, 16, 17), a first component (13) being supported by the rod or similar structure and able to be angularly moved about a fixed geometrical axis (12), and a second component (16, 17) being carried by the first and able to be angularly moved about a geometrical axis (15) which is parallel to the preceding and pertains to said first component.

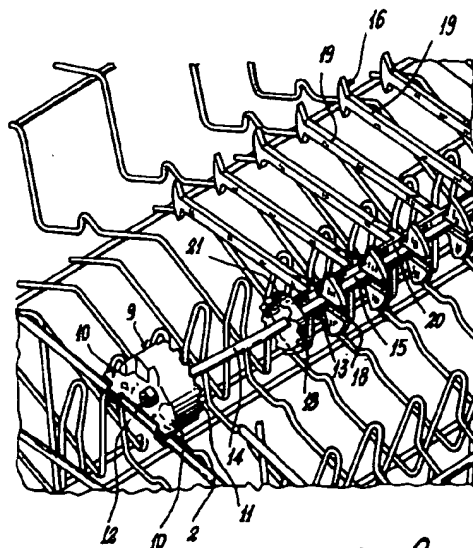


Fig. 2

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## Description

[0001] This invention relates to a rack for domestic dishwashers of the type defined in the introduction to the accompanying main claim.

[0002] The main problem which arises for domestic dishwasher manufacturers is to achieve the greatest possible versatility and containing capacity. To this end, careful study has been dedicated to the shape and construction of the relative racks, to make them able to receive crockery, saucepans, bottles etc. of the most varied shapes and sizes by utilizing their capacity to a maximum but without prejudicing their washing efficiency.

[0003] For example, racks (see for example GB A 231394) are still produced comprising support parts, generally for small cups, which can rotate about a horizontal axis such as to be brought into two positions, in one of which they act as a support, and in the other they are inoperative so as not to hinder the loading of an article of greater height on the underlying support region.

[0004] Other solutions, described for example in US-A-3,126,098, 3,269,548 and DE-A1 19755339, comprise comb elements supported rotatable about an axis in such a manner as to be able to be moved from a raised position in which they act as a lateral support for plates, to a lowered position in which they enable saucepans and the like to be loaded.

[0005] Other known solutions, described for example in US-A 5158185, comprise rotatable double comb structures. In one of the assumable positions combs of greater tooth pitch are operative, whereas in the other position the operative combs have teeth of smaller pitch.

[0006] Because of the limitation on the positions assumable by their movable parts, these known solutions do not satisfy the requirement of greater versatility (in the sense of greater adaptability to the load). To this must be added that when loading is complete, these movable parts of the rack can no longer be moved or adjusted. The result is that the user has to load the articles in a predetermined sequence to best utilize the loading capacity of the racks, and in certain cases there is an accessibility limitation at certain points of the racks.

[0007] The main object of this invention is to provide a rack comprising movable parts and which, compared with the known art, can be adapted to receive a wide variety of crockery, saucepans etc., can be used in a number of configurations greater than two, can be adjusted while loaded, and which allows wide freedom in the choice of loading and unloading sequences for the articles concerned.

[0008] This and further objects which will be apparent from the ensuing description are attained by a dishwasher rack in accordance with the teachings of the accompanying claims.

[0009] The invention will be more apparent from the

detailed description of some preferred embodiments thereof given hereinafter by way of non-limiting example and illustrated on the accompanying drawings, on which:

Figure 1 is a perspective view of a first embodiment of the invention;

Figure 2 is a perspective view of an enlarged detail of Figure 1;

Figure 3 is a side view of a detail of Figure 1, with parts omitted;

Figure 4 is a schematic view showing different ways of using that shown in the preceding figures;

Figures 5, 5A, 5B are respectively a side view, a plan view and a support detail of a second embodiment.

[0010] In Figures 1, 2 and 3 the reference numeral 1 indicates overall a domestic dishwasher rack, conventionally constructed of plastic coated metal rods bent to provide a rest and support for crockery and the like to be washed.

[0011] Specifically, the rod assembly defines a front wall formed partly by transverse rods 2 and 3, a rear wall formed partly by transverse rods 4 and 5, and two side walls indicated overall by 6 and 7 respectively.

[0012] In that embodiment of the invention being described, the rack 1 is provided, for greater versatility, with a supplementary base structure indicated overall by 8.

[0013] The structure 8 comprises preferably a pair of identical end supports 9 of plastic material which, although rigid, has a certain elasticity. These structures comprise a pair of clips 10 by which they are secured respectively to the rods 2 and 4 of the front and rear walls. They also comprise, on the opposite side to the clips 10, a ring toothing 11 facing the interior of the rack and acting as a frontal toothed wheel, at their centre they also rotatably supporting the pivot parts 12 of a metal bar 13 bent as a crankshaft. This bar 13 is thus bent to assume the configuration shown in Figure 3 and defined by the two end pivots 12, followed by an intermediate portion 14 forming a right angle to the relative pivot 12, and an intermediate portion 15 parallel to said pivots and hence at a right angle to the intermediate portions 14. As can be seen from Figures 1, 2, 3 the portions 14 are positioned to engage in the interdental spaces of the toothing 11, while being able to be (manually) moved from one of these spaces to another by virtue of the intrinsic elasticity of the material of the supports 9 for that bent bar, and also by virtue of the form of the toothings.

[0014] Such a construction enables the bars 13 to be made to assume different angular positions. The number of teeth and hence the interdental spaces can be two or more, depending on the number of discrete angular positions to be obtained.

[0015] In the example shown in Figures 1, 2 and 3,

two comb formations 16, 17 are mounted transversely on the intermediate bar portion 15. To enable them to be snap-mounted on the portion 15 of the bar 13, these formations (which could also be only one in number) comprise mutually aligned snap-mounting slots 18 (see Figure 2 in particular). Each comb formation 16, 17 is formed from a series of shaped parallel teeth 19 extending from a common connection rod 20 which at one end (the outer) carries a frontally toothed member 21 (also provided with a snap-mounting slot) and is arranged to also cooperate with the portion 14 of the bar 13 (see Figure 3) so that the inclination of the comb formations (16, 17) can be modified. Each comb formation is moulded in one piece from plastic. In the case of two comb formations, an elastic compensator element 130 can be mounted between them on the portion 15 to urge the comb formations outwards and hence urge the toothed members 21 into engagement with the portions 14 of the bar 13.

[0016] As will be apparent from the foregoing, the two comb formations 16, 17 can assume different spatial positions, the base structure 8 presenting two axes of rotation, one defined by the pivots 12 and the other by the portion 15 of the shaped bar 13.

[0017] As shown in Figure 4, by suitable and immediately obvious adaptations the base structures can be arranged in different positions of the rack, and the portions 14 be given different lengths (for example the left portion 14 being shorter than the right portion). This figure also shows different positions of the comb formations of the base structure 8, the purpose of this figure being to demonstrate the versatility of the invention. As is apparent, the base structure 8 can assume an inoperative position in which the relative comb formations do not intervene to modify the intrinsic loading capacity of the fixed part of the rack, which is unchangeable.

[0018] A modification of the inventive concept, still based on the presence of two parallel axes of rotation, one for the combination (bar + comb part or parts, which could also not be of comb type) and the other for that part which in the examples refers to comb formations (but which could also be not, or only partly, of comb type) is shown schematically in Figures 5 and 5A. In this example, in which parts identical or corresponding to those of the preceding figures are indicated by the same reference numerals plus the letter a, on the rods 2a, 4a there are snap-fitted known pivot supports 30 (a possible form of these is shown in Figure 5B).

[0019] These structures 30 rotatably support the pivots 12a of the shaped bar 13a which rotatably carries on its portion 15a a comb formation 16a with signal teeth (shorter teeth alternating with longer teeth). The end tooth or teeth carry a projecting transverse lug 31 intended to rest on the portion or portions 14a of the shaped bar 13a. The shaped bar 13a can hence assume two positions, shown one with full lines and the other with dashed lines. These two positions are for example established (see Figure 5b) by the structure 30

the end of which forms two angularly spaced steps 32, 32 on which the portion 14a rests in the two positions indicated. The comb formation 16a can assume three positions, two of which are obtainable when the shaped bar 13a is in the position shown by full lines (these positions are indicated by A and B) and the third when in the position shown by dashed lines.

[0020] The position B is obtained by rotating the comb formation 16a about the portion 15a of the crankshaft-shaped bar 13c. When in position B a protuberance 34 present on the comb formation halts against bars which form the grid structure of the rack.

[0021] The scope of the inventive concept also includes numerous possible variants. For example instead of the comb formation, different formations can be provided, for example in the form of a solid panel but provided with apertures for the necessary water passage.

[0022] The positions which the rotatable shaped bar and the formation mounted on it can assume can be set by stops which can be provided in suitable positions and formed by parts of the rack grid structure.

#### Claims

1. A domestic dishwasher rack comprising a structure formed from shaped rods or similar rod-like elements and carrying at least one device able, by angular movement, to assume different positions in order to increase the versatility of the rack in its use, characterised in that said device comprises at least two components (9, 13, 16, 17), a first component (13) being supported by the rod or similar structure and able to be angularly moved about a fixed geometrical axis (12), and a second component (16, 17) being carried by the first and able to be angularly moved about a geometrical axis (15) which is parallel to the preceding and pertains to said first component.
2. A rack as claimed in claim 1, wherein said first component (9, 13) comprises a member (13) formed as a crankshaft provided with end pivots (12) and with an intermediate portion (15) for supporting said second component (16, 17).
3. A rack as claimed in the preceding claims, wherein said second component (16, 17) is a comb formation or an apertured panel.
4. A rack as claimed in the preceding claims, wherein locking devices (9, 21) are provided to releasably lock said first and second component in selectable angular positions.
5. A rack as claimed in one or more of the preceding claims, wherein the releasable locking devices (9, 21) comprise toothed members cooperating with

said crankshaft member (13).

6. A rack as claimed in claim 5, wherein said said toothed members (9, 21) are in the form of first toothed members supported by the rack structure and rotatably supporting said second component (16, 17), and second toothed means (21) rigid with said second component (16, 17). 5
7. A rack as claimed in claim 1, or 1 and 2, or 1, 2 and 3, wherein stop means (32, 33) are provided to limit the angular movements both of the first component (14a) and of the second component (16a). 10
8. A rack as claimed in at least one of the preceding claims, wherein removable supports (30) are provided for supporting said first crankshaft component (14a) on the rack structure. 15
9. A rack as claimed in at least one of the preceding claims, wherein said second component is formed of two independently adjustable parts (16, 17) supported by said first crankshaft component (13). 20
10. A rack as claimed in claim 9, wherein an elastic compensator element (130) is provided between and engaging two comb formations (16, 17) of the second component, to maintain the respective toothed meters (21) engaged with a respective portion (14) of the first component (13). 25 30

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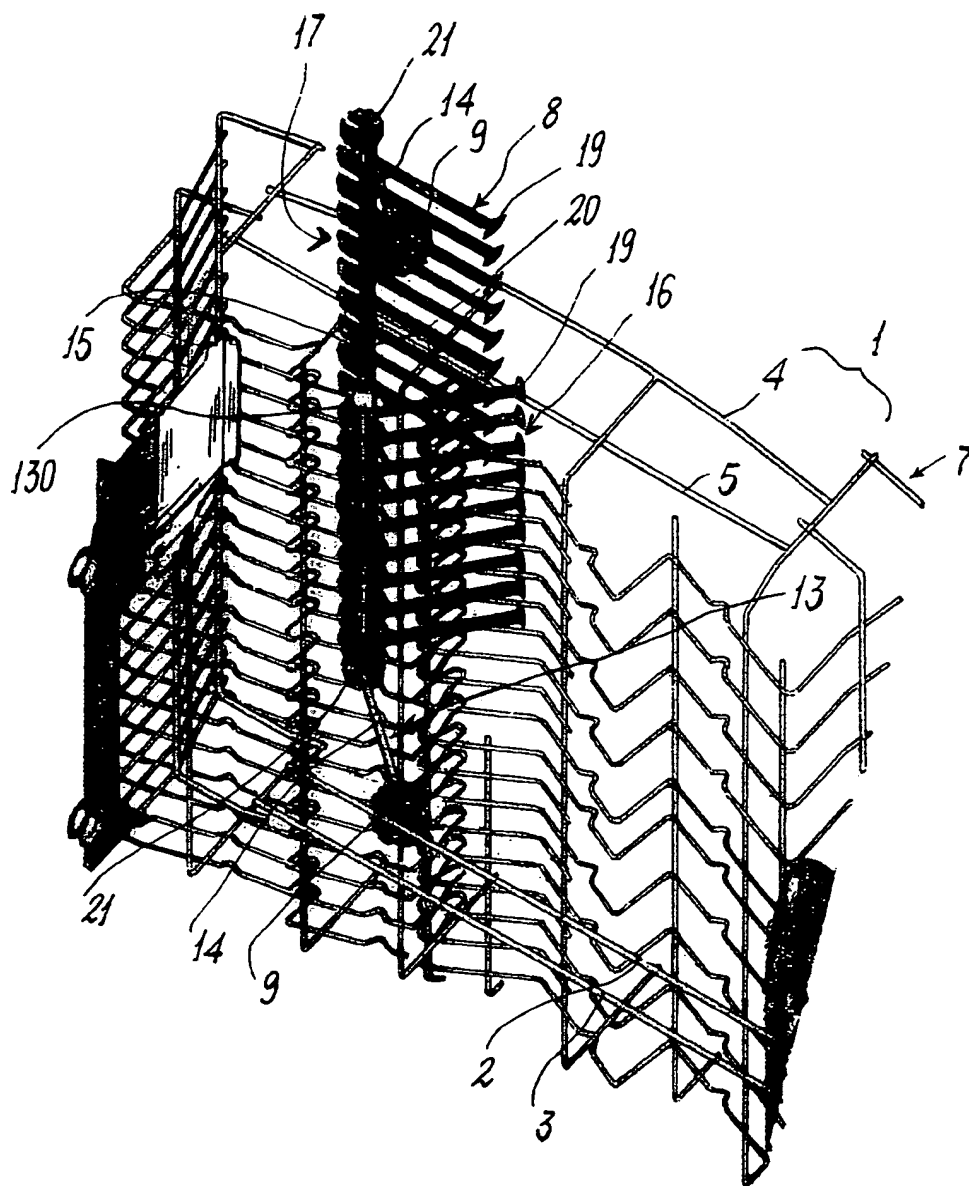


Fig. 1

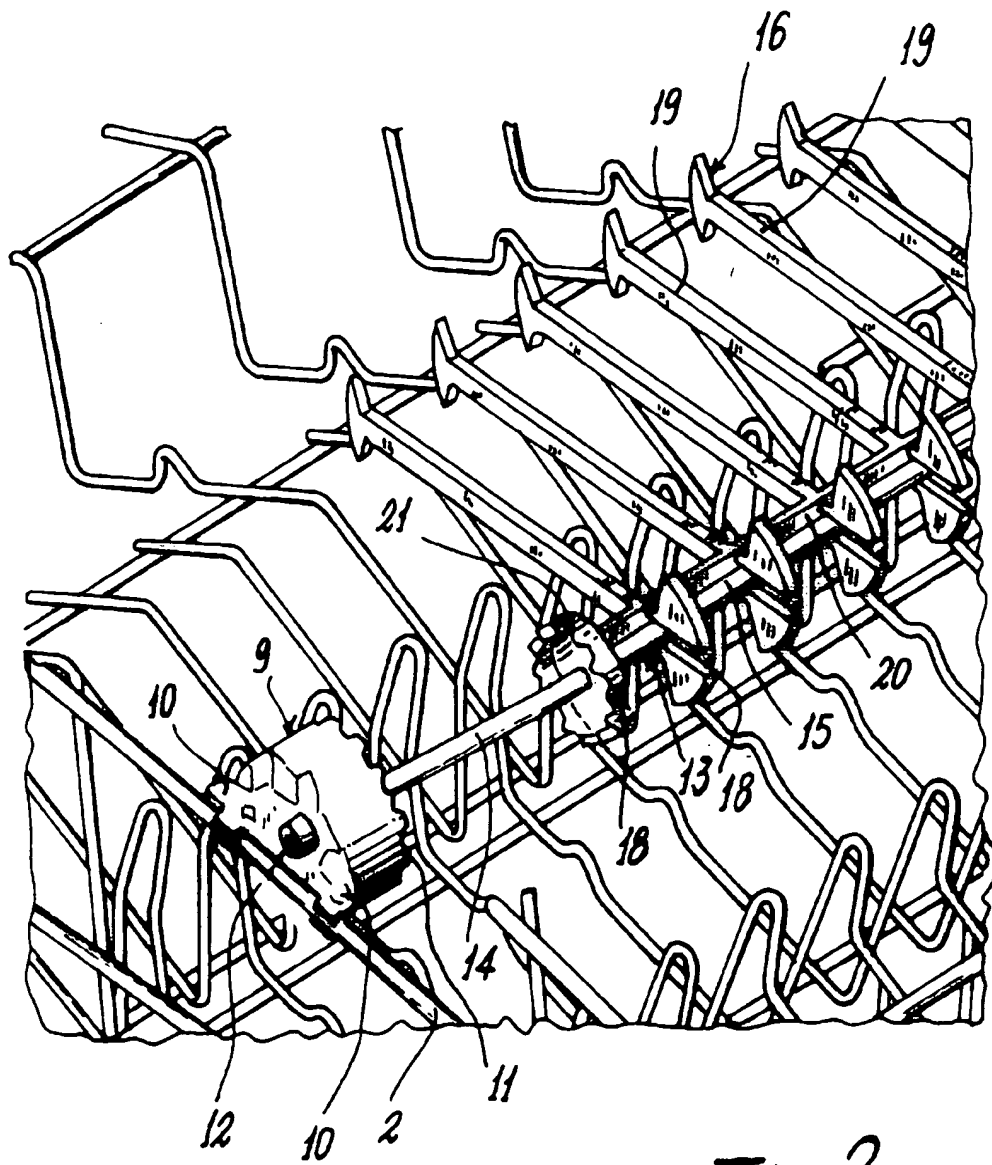


Fig. 2

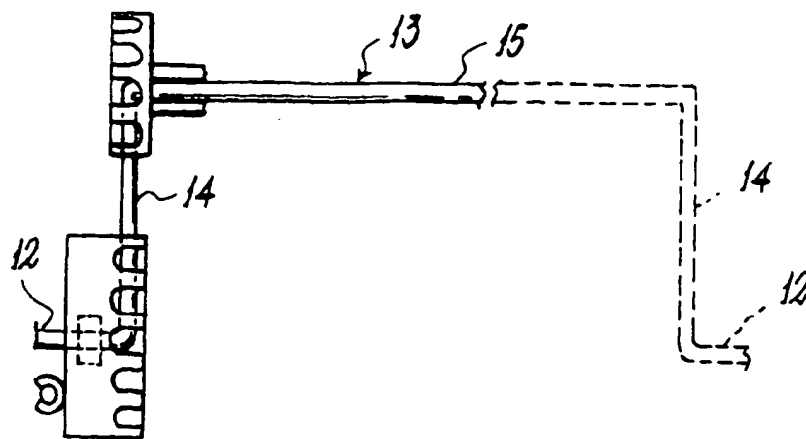


Fig. 3

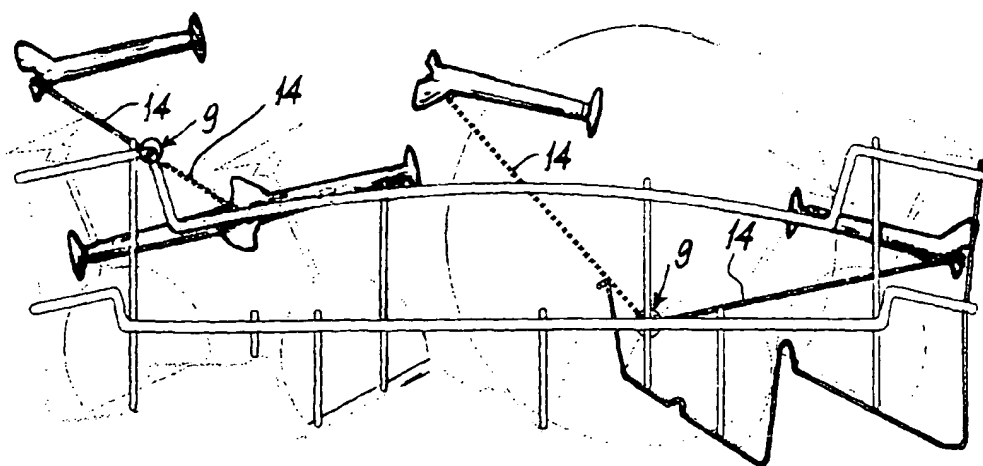
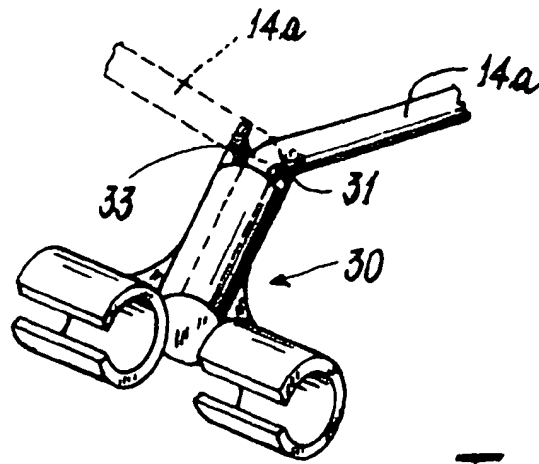
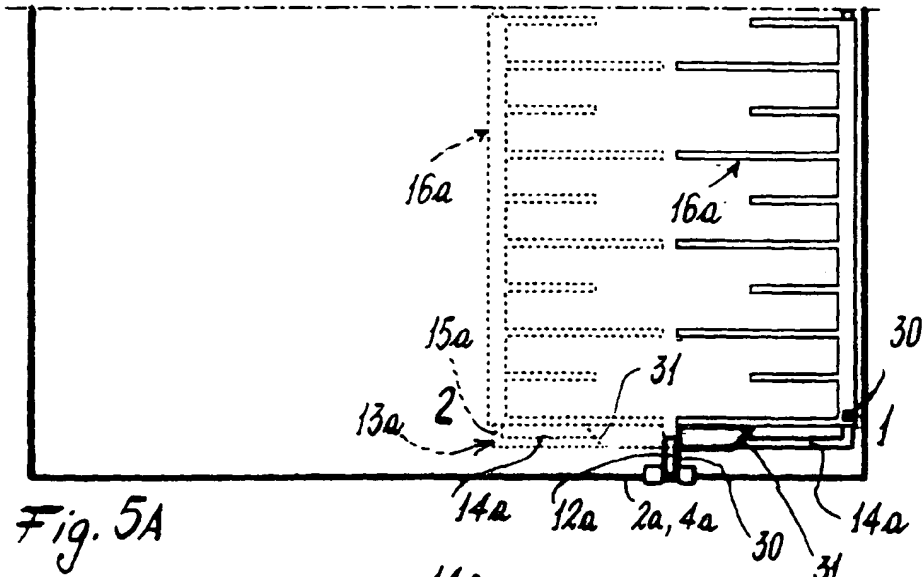
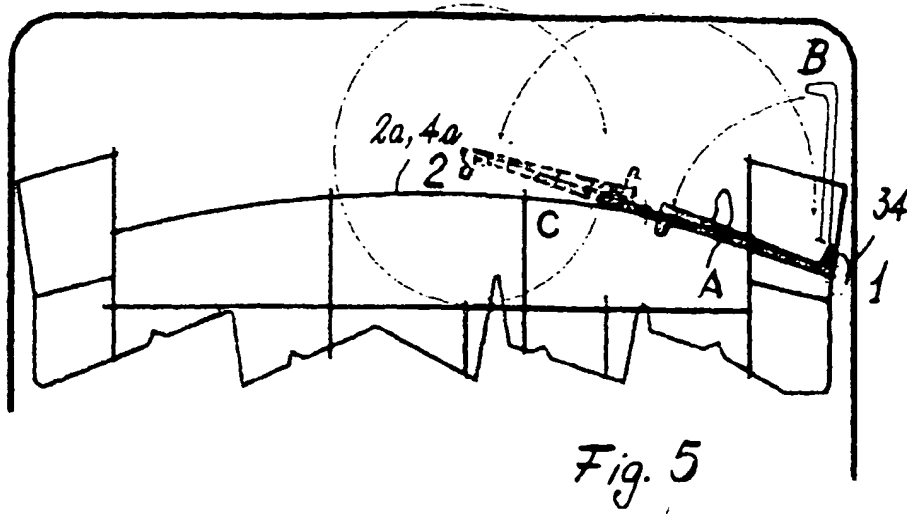


Fig. 4







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# EUROPEAN SEARCH REPORT

Application Number  
EP 99 12 2921

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 3 612 285 A (MASON ANTHONY) 12 October 1971 (1971-10-12) * column 1, line 49 - column 2, line 29; figures 2,3 *	1	A47L15/50
A	US 5 580 025 A (CROSS ROBERT) 3 December 1996 (1996-12-03) * column 2, line 25 - column 3, line 26; figures 1-4 *	1	
A	DE 31 35 458 A (LICENTIA GMBH) 24 March 1983 (1983-03-24) * page 4, column 5-18 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A47L
Place of search	Date of completion of the search	Examiner	
MUNICH	2 March 2000	Laue, F	
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EP 99 12 2921

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02-03-2000

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US 3612285 A	12-10-1971	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82